

# How to Make Your ZOOMerang

You can print out your ZOOMerang and make it into a little booklet.

## Here's how:

- Print all the ZOOMerang pages.
- Cut out each page along the dotted lines.
- Tape pages 1–6 together from end to end so that you have a long row.
- Tape pages A–F together to make a second long row.
- Lay one row face down on a table and put some glue on the back of the pages.
- Place the second row on top of the first row. The printed part of the second row should face you.
- Smooth out the glue with your hand.
- Let it dry and then fold your ZOOMerang where the pages join together.



## What You Need

- scissors
- tape
- glue

Voilà!



# Yeast

Did you know  
that yeast is alive?

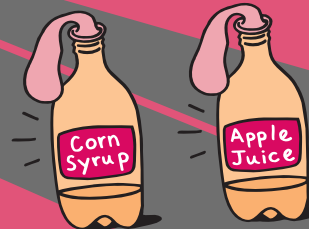
## What You Need

- 3 half-liter plastic bottles
- warm water
- corn syrup
- apple juice
- water
- marker
- 3 packets of yeast
- 3 balloons

**Pour** about an inch of warm water into each bottle. **Add** a different liquid (corn syrup, apple juice, or water) to each bottle until the bottle is about  $\frac{1}{4}$  full.

**Label** each bottle. **Put** a packet of yeast in the first bottle and quickly **cover the top** with a balloon. **Repeat** with the other two bottles. Then gently **shake** each bottle. **What happens** after 5 minutes? Which balloon is the **biggest** after **30 minutes**?

Now it's time to **experiment**. What happens if you **leave** the bottles **overnight**? Or, what happens if you **use different liquids**, like grape juice or cola? **Check** with an adult before you test a new liquid. Choose **one thing** to change (that's the variable), and **predict** what you think will happen. Then **test it** and **send** your results to ZOOM at [pbskids.org/zoom/sendit](http://pbskids.org/zoom/sendit)



Sent in by J.J. of Thousand Oaks, CA



### Science Scoop

The yeast inside a packet is **dormant**. This means that it is **inactive**. Yeast becomes **active** when you add two things: **heat** (warm water) and **food** (sugar). When yeast is active, it produces a **gas** called **carbon dioxide**. You can't see this gas. But you can tell that it's there because it **fills** the balloons. Which balloon inflated the **most**? Did one balloon **not inflate** at all? What do you think was **missing** from that bottle: heat, food, or both?



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### Investigate This!

What makes **bread rise**? It's the **carbon dioxide** produced by yeast. Check it out by baking some bread. Ask a parent if you can make

#### Bread in a Bag

(pbskids.org/zoom/cafe). Then **look** closely at a slice of bread. Do you notice **small holes**?

**Bubbles** of carbon dioxide make these holes.

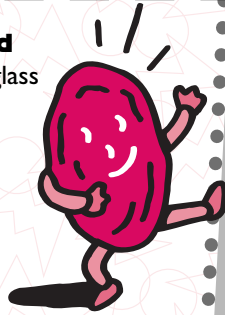


# Dancing Raisins

3

## What You Need

- tall, clear drinking glass
- raisins
- club soda that has lots of bubbles
- other foods (like a corn kernel or a chocolate chip)
- other liquids (like water or cola)

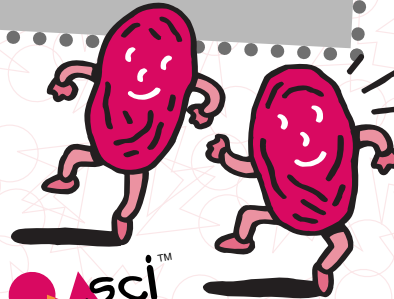


**Pour** the club soda into the glass.

**Drop** in half a raisin. **Wait** 20 to 30 seconds. **What happens** to the raisin? What is it about the raisin—its **weight**, its **shape**, its **size**—that makes this happen? Try dropping in something else, like a **corn kernel** or a **chocolate chip**. Do they **float** to the top? What happens if you use another kind of liquid, like **water** or **cola**? Does the raisin still float to the top?

## Science Scoop

What makes the raisin **float** to the top? The **bubbles**! The bubbles **stick** to the sides of the raisin and make it more **buoyant** [BOY-ant]. Buoyant means that something **floats** easily. The bubbles make the raisin float the way a **life jacket** makes a person float.



Sent in by Mary-Elizabeth G. of Tallasee, AL

**Start by being smart!  
Check out these safety  
rules before you do  
any activity.**

### **Science Safety Rules**

- **Ask** an adult for **permission** before starting an activity.
- **Ask** before **using materials** you find in the kitchen.
- **Do not eat** or drink while experimenting.
- **Ask** for help when using **scissors** or a **knife**.
- **Ask** before using the **oven** or **microwave**.
- If an activity is messy, **cover your workspace** with newspaper or go outside.
- **Wash** your hands after experimenting.



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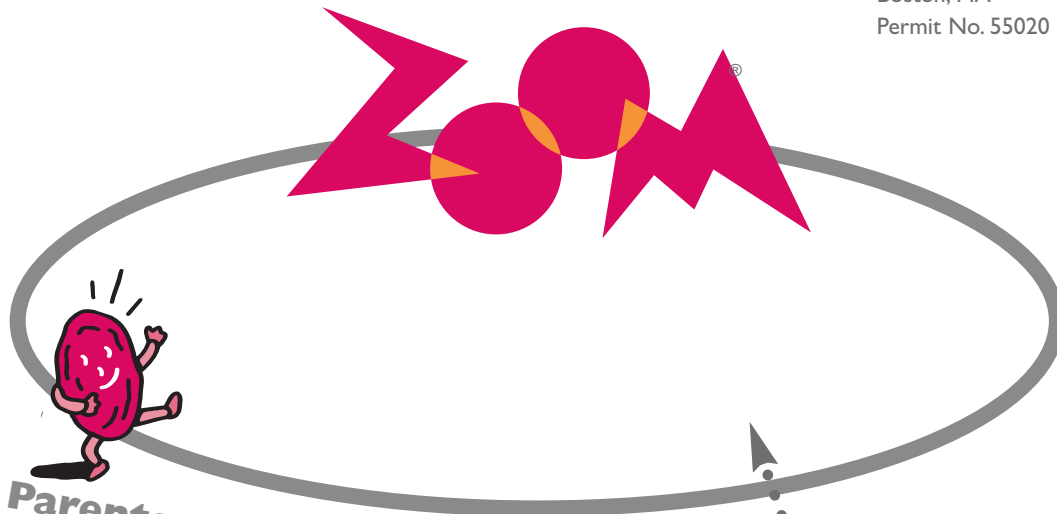
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**Parents:**  
Visit **ZOOMtoo** for tips on using  
ZOOM activities with your kids  
([pbskids.org/zoom/too](http://pbskids.org/zoom/too)).

Since you wrote to us,  
we're writing to **you!**



Look inside for science you can do in your kitchen!

**Zoerang**<sup>TM</sup>



The Arthur  
Vining Davis  
Foundations



# Kitchen Chemistry



Did you know that a lemon can **power** a clock, **launch** a rocket, and **shine** a penny? Or that the juice from a red cabbage **changes colors** when you mix it with different liquids?

You can do lots of fun **science experiments** right in your **kitchen**. Here are some of our **favorites**. You can find **more** activities at the ZOOMsci home page at [pbskids.org/zoom/sci](http://pbskids.org/zoom/sci). Have fun!



# Cabbage

**What are acids and bases?**

You come across **acids** and **bases** every day. Lots of vitamins in foods you eat are acids, like **vitamin C**. Lots of cleaning products are bases, like **soap**. How can you tell if something is an **acid** or a **base**? You can add it to **red cabbage juice**!

Red cabbage juice **changes color** when it's mixed with an acid or a base. The juice of a red cabbage is **purple**. When it's mixed with a **base**, like baking soda, the cabbage juice turns **blue**. When it's mixed with an **acid**, like vinegar, it turns **red**. Red cabbage juice is called an **indicator**. An indicator tells you whether something is an acid or a base by **changing color**.

**What You Need**

- red cabbage, cut in half
- grater
- large bowl
- measuring cup
- cold water
- strainer
- small bowl
- 3 small paper cups
- spoon
- vinegar
- baking soda
- other liquids (like lemon juice or dish detergent)

Sent in by Jacob F. of Opelousas, LA

B

# Juice Indicator

First, **make some red cabbage juice**. **Peel** off the **top** layer of cabbage leaves. Have an adult **cut** the cabbage in half for you. **Ask** for permission to use a grater and **grate** the cabbage into a large bowl until you have about 1 cup. **Cover** the cabbage with **cold water** and let it sit for at least **45 minutes**. Then **strain** the juice into the small bowl.

**Color of the control:** \_\_\_\_\_

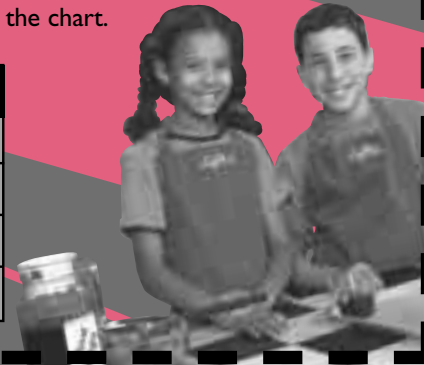
Test Item	Color	Acid, Base, or Can't Tell
Vinegar		
Baking soda		

**Put** two spoonfuls of cabbage juice in each cup. **Set** one cup aside. This is your **control**. You won't add anything to this liquid.

**What color** is the control? **Record** your answer above the chart.

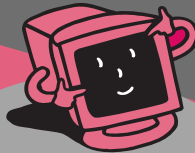
**Add** a spoonful of **vinegar** to the second cup of cabbage juice and **stir**. **What happens?**

**Add** a spoonful of **baking soda** to the third cup and stir. **What happens?** **Record** your results on the chart.





Now it's time for you to **experiment**. Find **other liquids** in your kitchen to test, such as lemon juice or dish detergent. It is very important to **check with an adult before testing liquids**. Some liquids found in the kitchen, like cleaning products, are dangerous. Predict whether the liquids are **acids** or **bases**. Then use the cabbage juice indicator to **find out**.



If you have an idea for a science activity, send it to ZOOM at [pbskids.org/zoom/sendit](http://pbskids.org/zoom/sendit)

D

### Investigate This!

How can you use an acid and a base to **launch a rocket**? Find out by making a **Lemon Juice Rocket** ([pbskids.org/zoom/sci](http://pbskids.org/zoom/sci)). Then keep experimenting to find out which liquids make the rocket fly the **farthest**.



If H<sub>2</sub>O is water, what is "H<sub>2</sub>O<sub>4</sub>"?

Drinking.

Sent in by Angela of IL

# Polishing Pennies

E



Are acids or bases better at cleaning pennies?

## What You Need

- 6 dull pennies
- 5 paper cups
- lemon juice
- spoon
- other liquids (like milk or apple juice)



**Put** a penny in each cup. You'll have **one penny** left over. This is your **control**. You **won't change** this penny so you can compare it to the pennies you do change.

**Pour** some lemon juice into the first cup. Make sure that the penny is completely **covered**. **Wait** about five minutes. Then **remove** the penny. What does it **look** like? **Compare** this penny's color to the control penny's.

**Keep experimenting** to find the best way to polish a penny! Find **other liquids** to test, like milk or apple juice, and **ask an adult** if you can use them. Add the **same amount** of each liquid to the remaining cups. **Wait** about 5 minutes. Then take a **look**.

Which liquids make the pennies **shiny**? Are these liquids **acids** or **bases**? Use the **cabbage juice indicator** to find out!

Sent in by Adriana F. of Prescott, AZ





### Science Scoop

A new penny is partly made from bright, shiny **copper**. But after a while, it loses its shine. Why? Because the **copper mixes with oxygen** in the air and makes a coating of **copper oxide**. When you put a penny in **lemon juice**, the dull coating of copper oxide goes away. That's because lemon juice is an **acid**. Acids can **dissolve** copper oxide.



F

**Zoo funny™**  
**Why didn't  
the scientist  
have a  
doorbell?**

*She wanted to win  
the "NOBEL" prize.  
Sent in by Marie of CA*